Response to RFP

Submitted to

County of Allegheny
Department of Human Services

Project Proposal to

Design and Implement Decision Support Tools and Predictive Analytics in Human Services

On the date of

April 15, 2014

TEMBO

p 215.427.3608
f 215.427.9320
a 1639 N Hancock Street
Studio 203
Philadelphia, PA 19122
w temboinc.com

Table of Contents

Section 1

Executive Summary

Executive Summary

Overview: Tembo is a growing small business located in Philadelphia, PA, that specializes in developing web tools, backed by deep analytics, for analysts and practitioners in the public sector. Tembo has three technical teams in-house—data analytics, product development, and web development—which allows us to provide end-to-end, custom development services. Most of our client engagements begin with a series of operational or research questions and result in custom web tools that integrate with, and transform, existing data systems. In our core practice area, education, our analytics and product development work has powered and supported accountability tools behind significant education reforms in the Washington, DC, Baltimore, New York City, and Philadelphia. Tembo has also developed custom data warehouses (integrated with nearly 15 external vendors) and interactive teacher dashboards for innovative charter management organizations that rely heavily on data for instructional decision-making.

Capacity: The proposed project team includes four data analysts experienced in public education, health, and child welfare research and practice, and three product developers that specialize in practitioner- and analyst-focused tools. Additionally, Frank P. Cervone (Executive Director, Support Center for Child Advocates), a long-time practitioner in the child welfare field, will be serving as the project's senior advisor.

Decision Support: The central goal of this project is to enable the Allegheny County Department of Human Services (DHS) to more effectively serve children and families through strategic analytics for case management. In collaboration with DHS, Tembo will develop the DHS Family Risk and Identification Tool to 1) put integrated descriptive and predictive client data at the fingertips of caseworkers and 2) aggregate case detail and likely case outcomes into a multi-user reporting system that enables managers and workers across DHS departments to more strategically deploy resources and make decisions based on insights from data analysis. This proposal does not prescribe specific analytics and decision support features of the Tool. Instead, Tembo's engagement will include extensive discovery, requirements gathering, and design activities to ensure that the Tool's analytics and web development efforts best enable DHS employees to more effectively serve children and families through the strategic use of data. While this is a custom application, it would be equipped with a flexible data model and server architecture that is prepared for future integration and scale-up.

Proposed Solutions: Tembo will provide an interactive, web-based solution that:

1. Regularly extracts and transforms data from the County's integrated human services data warehouse (HSDW) into flat analysis files suitable for predictive modeling;
2. Applies inferential statistical techniques to estimate clients' likelihood of various outcomes and stores the results in a custom, scalable database;
3. Integrates these risk predictions with current and historical data on clients' activities and agency involvement into dashboards for case workers that are highly visual, intuitive, and easily explained or presented;
4. Aggregates client risk estimates, case outcomes, and other data by worker, team, agency, geography, intervention or at other levels specified by DHS into an interactive dashboard with multiple permission levels; and
5. Supports user adoption through user guides, training, an online tutorial and the ability to display user-submitted tips and suggestions.

Funding Request

Our total funding request of $ 957, 000 includes the end-to-end creation of a custom, integrated web decision support tool, and includes all research and discovery, analytics, predictive modeling, design, and web development.

Section 2

Narrative [Part 1]

Capabilities

NARRATIVE | PART 1

Capabilities

1.1 History

Tembo, Inc. (Tembo) is a growing small business located in Philadelphia, Pennsylvania. We were founded in 2010 in response to a need for data-related services in the education sector. Our team provides end-to-end products and services to transform how data are analyzed, visualized, and utilized by public service practitioners. We strive to provide our stakeholders with the accessible, transparent information and insights they need to make more informed choices. To do so, we undertake ambitious engagements to manage, transform, and integrate disparate data; conduct complex statistical analyses; design intuitive web and print reports to visualize results; and build analytical capacity through strategic advising and training.

1.2 Experience

Tembo has developed a reputation for rapidly acquiring new domain knowledge, integrating complex and large data systems, and very quickly delivering on web products. Our team has a nuanced understanding of the operational and delivery challenges associated with human services, and draws upon the project team members' cumulative decades of work as practitioners, analysts, and advisors in child welfare, education, and public health.

Our project team has extensive experience with the specific analytic methods needed to predict likely outcomes like those identified in the Allegheny County Department of Human Services (DHS) request for proposals. The team is also experienced in the design and development of custom data reporting tools for early warning and intervention. Below we provide an overview of our experiences in the particular skill sets required for success in this project. Additionally, several examples of our analytical experience and/or tools are included in section 1.3, section 2.5, and Appendix I.

Research Design & Predictive Modeling

Tembo analysts take great concern for the detail and accuracy of data, but maintain a flexible analytic approach that allows for insights at varying levels of statistical precision. The project team has particular expertise in using quasi-experimental research designs and advanced statistical modeling techniques to create insights that can be used for intervention purposes.

In a recent example, Tembo led a groundbreaking data integration and strategy project for the Washington, DC Deputy Mayor for Education. For the first time in the city's history, Tembo combined rich administrative data on students' secondary and postsecondary outcomes with attendance, behavior, course-taking, child welfare, and juvenile justice data. Using this information, Tembo is influencing comprehensive policy change through 1) predictive modeling that isolates the student characteristics most related to dropping out, 2) high school effectiveness research that identifies schools

helping students 'beat the odds', and 3) complex latent class segmentation analysis that identifies distinct groups of disengaged students in high school. Insights from these analyses are informing the development of a citywide early warning system and supporting local leaders in identifying and targeting interventions to distinct subgroups of students. In addition to driving the analytics behind this project, Tembo managed the collaboration required from a coalition of stakeholders, including the DC Office of State Superintendent of Education, DC Public Schools, RaiseDC, and several public charter schools.

Translating Data into Practice

Tembo's analytics and product development work is especially focused on providing tools useful in applied settings. Our extensive discovery process works directly with practitioners to interview and shadow staff in order to better understand their interactions with, and requirements from, data systems. We then build data models specific to a client's operational questions and requirements, and do not prescribe data models. Similarly, our product development process is especially focused on how to make complex data a seamless part of a practitioner's workflow. Our creative team builds web tools that are highly intuitive and clean in design so that practitioners have a tool that is visual and accessible. Several of the tools in Appendix I serve as examples. Intuitive design is a particularly unique focus of our work motivated by seeing far too many data systems (especially those marketed in the public sector) that are dense and very difficult to maneuver.

After the development of a tool, Tembo's product team works very closely with practitioners and stakeholders at different levels to provide implementation support. This includes on-site training to build analytical capacity or support a tool's integration into everyday work scenarios, and documented user support like guides and built-in tool walkthroughs. Our team has significant experience with practitioners at highly variable capacities and comfort levels with data and technology use. Any one of our tools is usually used by a range of practitioners and analysts, from national or city-level policymakers and data analysts, to managers and administrators (e.g. school leaders, principals), to various applied settings (e.g. teachers, instruction coaches), to families and the public. Our team is also highly focused on communicating and reporting on complex data in an accessible way, and to a wide variety of audiences, in order to achieve the highest impact for the data. We have significant experience training professional audiences around the operational considerations in delivering child welfare, education, and public health services—while at the same time communicating with policymakers, for example, in advisory roles to the Philadelphia Mayor's office regarding child welfare systems, or to the World Health Organization regarding child- and family-focused primary health care.

As a testament to our work's success in translating data into practice, Tembo's analytics and products have powered and supported the accountability and performance management tools behind the significant education reforms in the Washington, DC, Baltimore, New York City, and Philadelphia public schools. Beyond our work in performance management, Tembo has worked to develop analytical data tools that support decision-making. For example, Tembo was recently contracted by the DC Office of the State Superintendent of Education to create a platform that would identify

students who are at risk of various negative outcomes from kindergarten through 12th grade. Tembo developed an operational data store to house longitudinal student data and built an interactive rule-builder that allows users to develop and test their own early warning indicators. Additionally, Tembo estimated 'best fit' early warning models for various outcomes and included the results in the tool. Tembo also implemented processes to integrate new models into the data store as they are developed by internal analysts and statisticians at the DC Office of the State Superintendent of Education. This tool is further detailed in Appendix I: DC Early Warning System.

1.3 Collaborations

Our work in the education and public services sectors often requires thoughtful collaborations with key stakeholders (discussed below) and service providers (please refer to section 1.5 for our experience integrating data and technology infrastructure).

Tembo has convened and led cross-functional groups for multiple clients to manage projects, review insights from analysis and ensure adoption of data tools and policy change. Engagements may require us to negotiate metrics and crunch data across stakeholders, facilitate the process of defining data needs and priorities for analysis and tools, or report on data analysis to audiences from cabinet-level officials to the public.

One example of our skills in driving complex collaborations is the 2013 release of the first DC Equity Report. This effort brought together DC's major education agencies to report on comprehensive school performance information across traditional public schools and public charter schools—for the first time in the city's history. The Equity Report was a multi-agency collaboration between the NewSchools Venture Fund (a nonprofit venture philanthropy firm), DC Public Schools, the DC Public Charter School Board, the Office of the Deputy Mayor of Education, and the Office of the State Superintendent of Education in Washington, DC. Tembo drove this collaboration and led the process of developing common metrics and business rules between sectors and independent government agencies. We crunched complex metrics for the first time across sectors (for example, student migration between schools), designed the report's creative concept, and automated the production of individual school PDF reports and a citywide compendium. The Report was welcomed enthusiastically, including recognition from *The Washington Post*[1] and *Education Week*.

1 Both media pieces published online December 11, 2013.

1.4 Proposed Process

The activities of this project will be distributed across six phases, each involving different levels of stakeholder engagement and project management. This process covers end-to-end services to meet the DHS' needs outlined in this RFP, from data analytics to the development and deployment of a web tool:

1. Discovery;
2. Requirements Documentation and Design;
3. Data Collection, Integration and Analytics;
4. Development;
5. User Testing and Quality Assurance; and
6. Implementation Support.

Each phase and its associated deliverables are outlined in more detail in the Project Plan section 2.2.

1.5 Integration

Approach

Our approach involves an extensive discovery period with department users so that we thoroughly understand the capabilities and constraints of existing platforms and project dependencies on third party vendors. Projects requiring the integration of data from multiple platforms involve a data mapping process whereby Tembo identifies each source system, its connectivity capabilities and the tables, objects and fields that will be integrated. Projects involving the deployment of custom software on third party platforms necessitate extensive requirements gathering and documentation.

Based on requirements approved by the client, Tembo and the clients' existing vendors develop a shared work plan that outlines project milestones and deliverables specific to those vendors. By documenting all responsibilities early in the project's lifecycle, we create a transparent, comprehensive process to ensure a successful and timely final product. This is further detailed in section 2.2.

Technical Capabilities

Tembo has extensive experience working with existing IT vendors and data systems, particularly within public services infrastructure, on a variety of custom web projects. Our technical capacities include, but are not limited to, these recent client experiences:

1. Configuring a server and developing reporting layers within the DC Office of the State Superintendent of Education's internal software and IT infrastructure;
2. Building architecture for charter management organizations that would do massive, real-time data collection from multiple data vendors with external data pulls by creating custom API routes and coordinating FTP, SFTP, FTPS automated pulls;
3. Integrating with internal authentication systems within The School District of Philadelphia; and
4. Building in-house capacity (e.g. MySQL tables, Stata) to clear, restore, and entirely manage the data architecture for Baltimore City Schools.

BOX 1
Tembo Highlights | Technical Solutions Applied in 2013-14

These highlights reflect solutions from some of our most recent projects. Our capabilities are certainly not limited to this list, and our team continues to work on the cutting edge, regularly testing new technologies.

Database design, setup, management, and optimization

- Relational experience: MySQL/MariaDB, SQL Server
- Non-relational experience: Mongo

Server architecture and configuration

- Primarily Linux based servers in Amazon Web Services (AWS)
- Simple servers for data collection (FTP, SFTP, FTPS, and automated scraping)
- Scalable secure web applications, including SSL, load balanced, scale both vertically and horizontally using AWS tools

Custom software solutions

- Custom reporting: D3 Javascript library, Google visualizations, Custom html/css solutions
- Role based and Access Control List based user systems
- API creation and integration
- Automated API and server scraping
- Google Drive integration
- Integration with other authentication systems (OAuth and homegrown)
- CMS platforms

Server-side languages and frameworks

Most commonly used: PHP, SlimPHP, Phalcon, Templating (Twig/Volt/Handlebars)

Front-end languages and frameworks

Most commonly used: HTML5/CSS, Javascript, jQuery and jQuery UI, D3, Underscore, Node/Express/Angular

Product development

PHP, CakePHP, Laravel, Yii, Wordpress, Joomla, Paypal IPN and other payment integrations, ASP.NET, JAVA (JDBC, spring framework), JavaScript (Backbone.js [MWC JS], jQuery Mobile, Prototype, Stripe, Grunt), iOS Obj-C

Section 2

Narrative [Part 2]

Project Plan

NARRATIVE | PART 2

Project Plan

2.1 Goals & Objectives

The central goal of this project is to enable the Allegheny County DHS to more effectively serve children and families through strategic analytics for case management. In collaboration with DHS, Tembo will develop the DHS Family Risk and Identification Tool to 1) put integrated descriptive and predictive client data at the fingertips of caseworkers and 2) aggregate case detail and likely case outcomes into a multi-user reporting system that enables managers and workers across DHS departments to more strategically deploy resources and make decisions based on insights from data analysis.

This proposal does not prescribe specific analytics and decision support features of the Tool. Instead, Tembo's engagement will include extensive discovery, requirements gathering and design activities to ensure that the Tool's analytics and web development efforts best enable DHS employees to more effectively serve children and families through the strategic use of data. Additionally, while Tembo is proposing to develop a custom application, it will be equipped with a flexible data model and server architecture that can be prepared for future data integration and scale-up requirements.

Ultimately, Tembo will provide DHS with an interactive, web-based solution that:

1. Regularly extracts and transforms data from the County's integrated human services data warehouse (HSDW) into flat analysis files suitable for predictive modeling;
2. Applies inferential statistical techniques to estimate clients' likelihood of various negative outcomes and stores the results in a custom, scalable database;
3. Integrates these risk predictions with current and historical data on clients' activities and agency involvement into dashboards for case workers that are visual and highly intuitive;
4. Aggregates client risk estimates, case outcomes and other data by worker, team, agency, geography, intervention or at other levels specified by DHS into an interactive dashboard with multiple permission levels; and
5. Supports user adoption through user guides, training, an online tutorial and the ability to display user-submitted tips and suggestions.

The specific functional and technical requirements for this project will be determined in collaboration with stakeholders at DHS. However, Tembo will design and implement a solution that supports the philosophy of integrated program services by:

- Delivering real-time (or near real-time) reporting of client outcomes, both individually and at key levels of aggregation, in an interactive dashboard that allows case managers and workers to visualize progress;

- Comparing caseloads across different programs and services to identify supplemental supports for specific children and families;
- Enabling access to key client data, such as historical program involvement and CANS or FAST assessment data, across agencies through a comprehensive user system and empowering caseworkers to provide services to client children and families across multiple programs;
- Improving caseworker efficiency by putting all caseload and service data at workers' fingertips, facilitating integrated service delivery and case assignment based on geography and case complexity;
- Integrating cross-system information-sharing and predictive analysis into existing human processes of continuous improvement (such as DHS' conferencing and teaming model) through look and feel, as well as supporting data governance and advanced analytics efforts;
- Evaluating programs by categorizing clients into custom intervention groups and comparing these to statistically created control groups; and
- Recommending supports based on success rates with similar clients.

2.2 Services

The activities of this project will be distributed across six phases, each involving different levels of stakeholder engagement and project management; please refer to section 2.4 for a more detailed project timeline.

The project phases are:

1. Discovery;
2. Requirements Documentation and Design;
3. Data Collection, Integration and Analytics;
4. Development;
5. User Testing and Quality Assurance; and
6. Implementation Support.

Each phase and its associated deliverables are outlined in more detail below. We also outline activities that will characterize stakeholder engagement across the project lifespan, but particularly affect the Discovery, Requirements Documentation and Design stages. This work will enable Tembo to identify the main outcomes to be predicted in the analytics stage and document key technical details regarding data availability and system constraints to be considered in the design and development of the data reporting tool.

[2.2.1] Discovery

Deliverables: Project charter, data dictionary

- In coordination with the DHS-appointed project sponsor, Tembo will identify and lead a cross-functional project team of 3-4 individuals that represent the Offices of Information Management Services; Integrated Program Services; and Data Analysis, Research and Evaluation. This group will be responsible for identifying the full range of strategic and operational research questions to be addressed by the project and will sign-off on the technical and functional requirements of the Tool.

- Throughout the discovery stage, Tembo will conduct interviews with subject matter experts representing the various service departments involved in the project (e.g., Health; Children, Youth and Families; Aging). These interviews will include departmental leaders, supervisors and case workers. Tembo will review any existing analytics work, data systems or data tools related to the display or modeling of client outcomes. This will allow the project team to understand how various teams within DHS are currently defining problems and solutions related to the strategic use of human services data. This process will be guided by the project team, key informants in the DHS, the project team's extensive work with other public sector clients, and the sector expertise of our advisor Frank P. Cervone. In particular, Tembo will identify opportunities to extend work previously completed by the Offices of Data Analysis, Research and Evaluation or Information Management Services to integrate efforts currently underway in the agency.

- Tembo will also plan and conduct interviews with data stewards from DHS and affiliated programs, as identified, to create technical requirements for transforming source data into the complete longitudinal analysis files. This discovery will include data sources currently integrated in the data warehouse, but may also include external sources requiring integration to successfully predict the most important client outcomes identified by the project team, such as data from Pittsburgh Public Schools and other County school districts, juvenile probation data and public welfare and housing data. Tembo will assess data quality and availability, including 1) which client data fields are available from these external sources and in which formats and 2) what options exist to transfer those data (e.g. API, SFTP, manual export, etc.).

- Tembo will develop and maintain a detailed project charter that organizes each phase of the engagement and catalogues key questions and insights from both the one-on-one structured interviews and larger project team discussions. An initial project timeline is provided in section 2.4. Tembo will summarize all data sources and elements to be included in analysis in a comprehensive data dictionary. This document will be used to identify business rules for various analyses and hone the project's overall analytic plan. On an ongoing basis, Tembo will plan and facilitate biweekly project management meetings using these documents to identify and mitigate any project risks and escalate items for update, feedback, action or decision-making.

[2.2.2] Requirements Documentation and Design

Deliverables: Requirements document with use cases, workflows and wireframes; fully fleshed-out creative concept (designs)

- Throughout the discovery stage, Tembo will document use cases that surface through both the one-on-one structured interviews and discussions with the larger project team. A use case, for example, would document the series of actions a case worker might have with the system towards a goal of accessing and using data. This list will be reviewed with the DHS project team to identify the most important data displays to be supported by the online Tool we develop.

- Additionally, Tembo will work to identify the optimal design and feature set of the Tool by mapping the processes through which DHS employees at different levels currently interact with client data. Specifically, Tembo will identify the current workflows that prospective users (agency leaders, supervisors and case workers) follow for performance management, oversight and case management, respectively. Tembo will then work with the DHS project team to identify process stages in which the Tool can provide decision support (e.g., at intake for service placement).

- Prior to development, Tembo will prepare written documentation of all key technical and functional requirements for the Tool. Tembo will work with the DHS project team to articulate requirements in the following areas: integration with other systems; tool inputs and outputs; user profiles; access, authentication and permissions; report features; technical constraints; availability and performance; security and data storage.

- While analysts at Tembo work on the project's requirements, designers at Tembo will begin drafting sketches and wireframes to detail the overall functionality of the Tool. These sketches and wireframes will include explanations of information hierarchy and general user-interface to best support staff in decision-making. Once wireframes have been reviewed and approved by the DHS project team, Tembo will expand the wireframes into a fully fleshed-out creative concept, detailing the multiple views and data displays within the Tool.

- The web development team will begin the environment building concurrently with this design process. Our web development team largely utilizes a disciplined agile (e.g. iterative) development methodology internally, in sequence with our product development and creative teams.

[2.2.3] Data Collection, Integration, and Analytics

Deliverables: Analytic plan, flat analysis files, data integrity reports, metrics database and schema (or extension to existing data warehouse), results slide pack

- The exact data collection, integration and analysis activities for this project depend on the design of the Tool itself, as specified with the DHS project team, but this stage will be characterized by four main activities:
    - Extracting data from the data warehouse (and other sources, as determined) and transforming them into flat files suitable for statistical analysis;
    - Specifying and estimating predictive models of positive and negative client outcomes and testing/conducting diagnostics on those models;
    - Loading the results of statistical analyses, such as coefficients, standard errors, and fit statistics into the data warehouse or another database connected to the data warehouse; and
    - Connecting the data warehouse and/or affiliated database to the Tool itself via API.

- Using the data dictionary created during the discovery process, Tembo will coordinate a data collection effort to combine key information from the data warehouse with other sources identified in phase 1, if needed. Tembo will set up a secure file transfer protocol (SFTP) location for receiving data extracts from various 3rd party applications or work to connect with those applications directly via API or ODBC. If SFTP is used, Tembo will work with data stewards to design file layouts formatted to their submission specifications. Throughout the process, Tembo will comply with applicable laws and regulations around data security.

- Tembo will then develop custom code to transform and clean submitted data files based on the business rules identified in the discovery phase. Tembo will also implement quality assurance checks throughout the Data Collection phase, ensuring that all values are acceptable as defined by the data dictionary. Additionally, Tembo will create a custom data integrity report to flag potential data entry or processing errors and prevent erroneous records from being incorporated into the analysis files.

- To support the analysis stage, Tembo will create an analytic plan that catalogues the key outcomes to be modeled in the analytics stage, hypothesized predictors of those outcomes, detail on the analytic samples to be used in estimation and descriptions of the methodological approach Tembo will employ for each model.

- The analytics activities will involve extensive data transformation and statistical analysis of existing DHS data to build the statistical models that will power the Tool. Tembo analysts take great concern for the detail and accuracy of data, but maintain a flexible analytic approach that allows for insights at varying levels of statistical precision. The project team has particular expertise in using quasi-experimental research designs and advanced statistical modeling techniques to drive insights in public agencies in applied settings. In particular, the project team has extensive experience with multivariate regression and multilevel mixed modeling (also known

as hierarchical linear modeling) with both continuous and discrete outcomes to identify the predictors of clients' success in nested, longitudinal data. Tembo will apply appropriate estimation techniques to DHS data to develop predictive models for outcomes specified in collaboration with DHS (e.g., likelihood of future abuse). These models will be County-specific, not based on estimates from other jurisdictions, and can be applied to incoming cases to predict likely future outcomes.

- All analytic results for this project will be summarized in a detailed project deck (in either PPT or PDF format) and the metadata (coefficients, standard errors, and diagnostic and fit data) from best-fit models for each outcome will be loaded into a database or tables connected to the existing data warehouse. Incoming client characteristics can then be multiplied by the predictors in these data tables to produce likely outcomes appropriate to their case. The Tool can access these predicted outcomes alongside the clients' observed information.

- Tembo will also produce documentation for the project team that includes a published schema for the database (if a new database is created) and a data dictionary outlining the names and descriptions of all fields in the database (or a summary of modifications made to the data warehouse). Common keys, including agency codes and unique client and family identifiers, will be used throughout.

[2.2.4] Development
Deliverables: closed Beta product

- During the discovery process, our web development team will identify all technology requirements and limitations, particularly within the integration of multiple data sources. This will have included, as previously outlined, a functional requirements specification document on a view-by-view basis (e.g. identify how views/pages may work together and what information needs to be passed from screen to screen). Our web development team will use this functional document to create a development roadmap with internal/external milestones that tie to actual deliverables.

- Our web development begins with the purchase, set-up, and configuration of all necessary software/hardware for internal and external development and staging environments. This includes ensuring that the configuration of new environments matches the production environment (if it already exists). This also includes the data and service integration for components (e.g. user systems) that must be used.

- The team will build a RESTful API (an architectural style) that allows simple querying of the database; the database will be designed for any optimized subsets or processed data from existing models. The team will then template the web application shell and write the HTML/CSS/Javascript to create views (login, view1, view2, etc.) and custom charting necessary.

- Initial development QA (internal) begins once views and charting have been set up, while iterating on any left over smaller design tweaks.

[2.2.5] User Testing and Quality Assurance

Deliverables: product hand-off

Internal QA

- *Data:* Quality assurance checks will be integrated throughout data collection, cleaning, and metric calculation phases. Tembo will spend significant time on quality control and assurance, checking transformed variables against the original data files, ensuring accurate calculations throughout the process. For added security, these checks will be done both in Stata/SAS and Excel.

- *Data calls (refer to section 2.2.3)*: error reporting will be automatically registered in a daily log file (with automatic emails) that can mark non-existent routes, empty responses, empty folders (in the case of FTP scraping), bad authentication, changes in routes and/or tokens, and server outages or crashes.

- *Views:* Our quality assurance (QA) analysts and independent testers review product development at an appropriate stage of development, and document issues in detail (e.g. steps to replicate a break, browser, OS, resolution). The team also examines the functional requirements document line-by-line to ensure that the build works as outlined in the discovery process with stakeholders. This process includes input validation and attempting to break functionality wherever possible by making improbable choices, selections, inputs, dates, etc. The web development team assigns a priority to each QA issue identified to ensure a streamlined pipeline where high priority are solved first. Once the tool(s) have passed through internal QA, they are opened to external QA and user testing.

External QA & User Testing

- Testing users are a finite group of independent testers (e.g., super users, key stakeholders) selected from a range of DHS practice areas and data/technology comfort and use levels. User testing can occur one of three ways, and is usually a triangulated methodology: (a) users work through the functional requirements document, (b) users run through the tool with some guided prompts (e.g. how would you use the system to ask/answer X question or approach Y case in your daily work), or (c) users have an open-ended opportunity to use the tool and identify functional or other issues.

- Tembo builds and maintains a documentation platform where users describe any issues noted. These are cataloged by priority, and fixes are well documented for a historical record by the web development team.

- Testing will happen on the external development environment and when signed off, the changes can be pushed to the staging environment where they can be retested manually or automatically, and then pushed to the production environment.

[2.2.6] Implementation Support

Deliverables: user guides and Wiki, on-site training, open ticketing system

- Tembo's implementation support involves a combination of (a) on-site training and consultations, and (b) supporting documentation.

- Training and consultations: Tembo will run extensive on-site training with both end-users and technical staff; training is focused on the tool's application to their respective responsibilities. Additionally, technical staff can be trained around tool use like manually running an automated job or connecting to database(s) directly without the use of the tool(s).

- For documentation: an on-board, integrated walk-through feature will provide users with step-by-step assistance on the tool's use. User guide(s) accompany the tools in versions for end-users as well as technical support that need to know finer details (e.g. database structure or application server settings). Tembo will also create a Wiki or knowledgebase for DHS administrators to curate support and document adoption. Tembo will develop a feature within the tool that allows administrators to display selected tips and suggestions provided by tool users within the interface.

- Tembo will also maintain an open ticketing system for users to report on experiences, bugs, feedback, functionality requests, etc. There can also be arrangements for continued phone and in-person consultations as per AC DHS requirements.

2.3 Integration

Tembo's discovery process prepares our team to develop a Tool that both provides (a) a custom solution focused on the best application of local data and AC DHS' operational questions, and (b) a solution that is highly integrated and scalable. The discovery process also helps us define how data will be integrated by (a) identifying which current tools and systems require integration, (b) clarifying the mode of integration for each (e.g. allow data output, data input, or non-data related integration, automated or not), and (c) the limitations and/or requirements for each system. Use cases will also inform the type of integration required:

1. Input Integration (data coming into our tool)
    - Automate scraping solutions where we query existing APIs to generate files for team data to extract, transform, and load into our own systems
    - Create an exposed API that allows authenticated users to use a set of API routes we provide for data insertion

2. Output Integration (data being extracted from our tool)
    - Solution designed to create an automated CSV file
    - Create an exposed token authenticated API that allows authenticated users to query or insert data; scheduled tasks can also be established to communicate with the other technologies

2.4 Project Timeline

Dates are deliberative // assumes 9.1 project start

Strand	Task	Owner	Est. Date	Status	Notes
Project management	Create Google doc for project materials	Steve	9/1/14	On track	
Discovery	Create project charter in Google doc	Steve	9/1/14	On track	***DELIVERABLE
Project management	Confirm members of internal project team[2]	DHS PM	9/1/14	On track	
Project management	Soft kickoff w/ internal project team	DHS PM	9/8/14	On track	Purpose: sketch discovery questions, identify SMEs for interviews
Data collection	Execute any MOAs w/ DHS or other providers needed	David	9/8/14	On track	
Discovery	Review discovery approach & interview questions	Frank	9/12/14	On track	
Discovery	Send invitations & interview questions to stakeholders	Steve	9/15/14	On track	Also request prior work samples
Discovery	Begin SME interviews	Steve	9/29/14	On track	
Discovery	Meet with DARE, IMS to identify efforts underway	Steve	9/29/14	On track	
Discovery	Identify data sources outside of data warehouse for inclusion	Steve	9/29/14	On track	Just need the list of potentials
Data collection	Establish ODBC or API access to data warehouse	Eric	9/29/14	On track	
Discovery	Begin data steward interviews	Eric	10/6/14	On track	
Requirements	Document integration methods for existing data sources	Eric	10/27/14	On track	For inclusion in requirements doc
Discovery	Document business rules for working with key client data elements	Eric	10/27/14	On track	
Discovery	Complete meetings with data stewards	Steve	10/27/14	On track	
Discovery	Complete meetings with SMEs	Steve	10/27/14	On track	
Discovery	Review SME notes, early use cases & design concepts	Frank	10/31/14	On track	
Requirements	Identify user profiles, access, authentication/permissions	Sam	11/10/14	On track	For inclusion in requirements doc

2 Representation from Offices of Information Management Services; Integrated Program Services; and Data Analysis, Research and Evaluation

Project Timeline, continued (2)

Strand	Task	Owner	Est. Date	Status	Notes
Discovery	Complete first data dictionary	Eric	11/10/14	On track	***DELIVERABLE
Data collection	**Setup SFTP locations for other data files, send to data stewards**	Eric	11/10/14	On track	
Requirements	Identify technical constraints, availability/performance, security and data storage	Sam	12/1/14	On track	For inclusion in requirements doc
Requirements	Complete use cases document - case workers	Mike	12/1/14	On track	For inclusion in requirements doc
Requirements	Complete workflow maps - case workers	Mike	12/1/14	On track	For inclusion in requirements doc
Data integration	Complete data integrity reports	Eric	12/1/14	On track	***DELIVERABLE
Data analysis	Complete first draft of analytic plan	Steve	12/1/14	On track	***DELIVERABLE (includes hypothesized outcomes, predictors, analytic approach)
Data analysis	Code complete to transform warehouse table data into flat files for analysis	Eric	12/1/14	On track	
Requirements	Complete use cases document - case supervisors	Mike	12/8/14	On track	For inclusion in requirements doc
Requirements	Complete workflow maps - case supervisors	Mike	12/8/14	On track	For inclusion in requirements doc
Requirements	Complete use cases document - agency leadership	Mike	12/15/14	On track	For inclusion in requirements doc
Requirements	Complete workflow maps - agency leadership	Mike	12/15/14	On track	For inclusion in requirements doc
Design	Review roles, use cases	Frank	12/15/14	On track	
Design	Send first wireframes for tool (all views)	Mike	12/15/14	On track	For inclusion in requirements doc
Data integration	Identify schema for metrics database to power tool (& include model results)	Eric	1/12/15	On track	***DELIVERABLE
Design	Send revised wireframes for tool	Mike	1/12/15	On track	For inclusion in requirements doc
Requirements	Submit requirements documentation	Steve	1/12/15	On track	***DELIVERABLE (includes workflows, use cases, wireframes)
Data analysis	Identify best-fit models & complete diagnostics (round 1)	Steve	1/12/15	On track	
Development	Complete hardware/software acquisition (purchase, setup, configuration)	Sam	1/12/15	On track	
Development	Update development roadmap based on requirements	Sam	1/19/15	On track	

Project Timeline, continued (3)

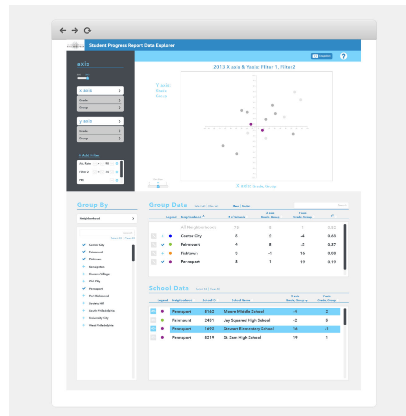
Strand	Task	Owner	Est. Date	Status	Notes
Requirements	Final sign-off on requirements	DHS PM	1/26/15	On track	
Data analysis	Identify best-fit models & complete diagnostics (round 2)	Steve	2/9/15	On track	
Development	Dev sprint 1 complete	Sam	2/9/15	On track	RESTful API
QA	Establish error reporting for data calls	Sam	2/9/15	On track	
Design	Complete first version of creative concept (full designs)	Mike	2/16/15	On track	
Data analysis	Identify best-fit models & complete diagnostics (round 2)	Steve	3/2/15	On track	
Design	Complete second version of creative concept (full designs)	Mike	3/9/15	On track	
Data analysis	Complete slide pack with model results & diagnostics	Steve	3/16/15	On track	***DELIVERABLE
Data analysis	Review insights from analytics	Frank	3/16/15	On track	
Development	Dev sprint 2 complete	Sam	3/16/15	On track	Web application shell
Design	Complete third version of creative concept (full designs)	Mike	3/30/15	On track	
Data integration	Load results of analysis into metrics database (coef, SEs, etc)	Eric	3/30/15	On track	
Development	Dev sprint 3 complete	Sam	4/20/15	On track	Views (HTML/CSS/Javascript)
Data integration	Complete API creation to load source data into metrics database	Sam	4/27/15	On track	
Data integration	Updated data dictionary & mapping document	Eric	5/11/15	On track	***DELIVERABLE
Development	Dev sprint 4 complete	Sam	5/25/15	On track	Views (HTML/CSS/Javascript)
Development	Complete beta version of tool	Sam	6/15/15	On track	***DELIVERABLE
QA	Setup QA tracker	Meg	6/15/15	On track	
Implementation	Finalize adoption plan	Frank	7/13/15	On track	
Testing	Setup testing forms	Meg	7/13/15	On track	
Testing	User testing begins	Meg	7/13/15	On track	
Testing	User testing ends	Meg	7/31/15	On track	

Project Timeline, continued (4)

Strand	Task	Owner	Est. Date	Status	Notes
Implementation	Establish site for training materials	Meg	8/3/15	On track	***DELIVERABLE
Implementation	Establish ticketing system & process	Meg	8/3/15	On track	***DELIVERABLE
Implementation	Complete adoption manual	Meg	8/10/15	On track	***DELIVERABLE
Implementation	On-site training session #1	Meg	8/17/15	On track	***DELIVERABLE
Implementation	On-site training session #2	Meg	8/24/15	On track	***DELIVERABLE
Implementation	On-site training session #3	Meg	8/31/15	On track	***DELIVERABLE
QA	Ongoing	Sam	ongoing	On track	

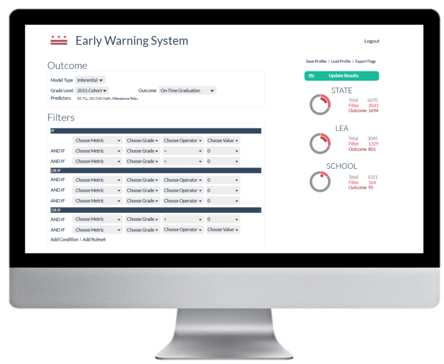
2.5 Examples

Most of our client engagements involve a services-tool mix; that is, we begin with operational research questions, and after running analysis, build a custom tool that allows users to apply the data to their everyday work. We provide several such examples below. Please find more detailed descriptions and visuals of each tool in Appendix I.



Portfolio Performance Analyzer
[The School District of Philadelphia]

This scatterplot web tool has flexible menus that allow users to further refine their search, filtering data on a variety of service provider-level characteristics (in this case, school-level characteristics, e.g., management type, region), and detailing both summary results and individual reports (e.g., school scores) in data tables beneath the main chart. The end result is a streamlined system that allows staff to quickly test hypotheses and investigate data on the fly.



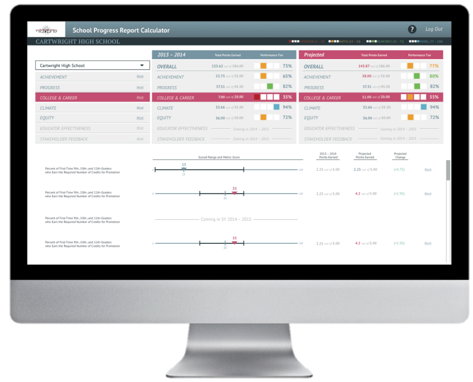
DC Early Warning System
[Office of the State Superintendent of Education]

Tembo developed an operational data store to house longitudinal data for several different student cohorts that contain a combination of academic, behavioral, and demographic indicators. We built an interactive rule-builder that allows users to develop and test different combinations of these early warning indicators. Separately, our analytics team estimated 'best fit' early warning indicators and included the resulting model in the rule-builder tool.

Progress Simulator
[New York City Department of Education]

Tembo estimated school growth on progress, performance, and environment metrics using multilevel models, and built an Excel-based scoring simulator to compare results of school performance under various model specifications.

School Progress Report (SPR) Calculator
[The School District of Philadelphia]



The SPR Calculator has two primary functions. First, it allows a practitioner (in this case, the principal) to quickly view their overall performance score and specific sub-scores. Second, the tool allows principals to model changes in these scores. For example, using the SPR calculator, a principal could simulate how improving attendance would affect the school's overall SPR rank. By providing practitioners with the ability to model effects, the SPR calculator serves as a powerful predictive tool, and allowing thoughtful strategic planning.

Insights Dashboard
[Digitas Health]

Tembo works with Digitas Health to better understand client pathways from different marketing touch points to conversion. Our team is finalizing an engagement where we will build dashboards across several drug indications that allow users to explore a client's pathway from marketing measures to patient conversion. The proposed views provide both a macro-level analysis of particular programs and the ability to drill down into individual data streams and reports.

Our Digitas engagement is a good example of our ability to rapidly build knowledge, and conduct complex analyses, in a new domain.

2.6 Team

The proposed project team includes experienced data analysts, web developers, and a human services practice advisor. Our team has years of direct experience supporting public education, healthcare, and child welfare projects. Tembo has three technical teams in-house: data analytics, product development, and web development, which allows us to readily handle engagements focused on translating analytics into intuitive, creative tools that facilitate empirically informed practice and—through the tools' accessibility and comprehensiveness—focus on building analytical capacity in-house.

Frank P. Cervone — Senior Advisor
Executive Director | Child Advocates

Frank is the Executive Director of Child Advocates, the lawyer pro bono program for abused and neglected children in Philadelphia. Prior to his work at Child Advocates, Frank was a Staff Attorney at Delaware County Legal Assistance Association and Adjunct Clinical Professor at Villanova University School of Law, where he instructed law students in domestic-abuse and child-support litigation. He previously served as counsel for Saint Gabriel's System, an agency providing treatment services for juvenile offenders. He is a founder and co-director of the National Children's Law Network, former chair of the Board of the Children's Trust Fund of Pennsylvania, former chair of the American Bar Association Section of Litigation Task Force on Children, and served as a member of the Supreme Court of Pennsylvania Juvenile Court Procedural Rules Committee. In 2006-7 Mr. Cervone served as a member of the Mayor's Child Welfare Review Panel examining the Philadelphia child welfare system. Mr. Cervone lectures and trains both lay and professional audiences in child abuse and child advocacy.

He is the 1998 American Bar Association and Pennsylvania Bar Association Child Advocate of the Year, 2010 Pennsylvania Coalition Against Rape Vision of Hope Award and 2011 recipient of the Philadelphia Bar Association Andrew Hamilton Award. Frank is a graduate of the University of Pennsylvania and Villanova University School of Law and has a Masters Degree in Theology and Ministry from LaSalle University.

Steve Cartwright — Project Director
Director of Analytics | Tembo

Steve leads research, evaluation and other data-analytic projects for Tembo, focusing on the longitudinal analysis of large, micro-level datasets. Prior to joining Tembo, Steve managed the analytics portfolios of StudentsFirst and DC Public Schools, where he was a Fellow with the Strategic Data Project at the Harvard Center for Education Policy Research. Steve began his research career in the Urban Institute's Education Policy Center and spent a year advising Washington, DC's neighborhood-based child welfare centers on outcomes management.

David Stewart
Founder and CEO

David has been working with student assessment data for more than 20 years. He completed a Master's Degree in Statistics and Measurement at the University of Pennsylvania, and formerly led the school accountability portfolio in the New York City Department of Education as the Executive Director of Evaluation and Performance Reporting. In this role, David was responsible for the development and continuous improvement of the School Progress Reports, Quality Reviews, and Learning Environment Surveys. David's interests include developing alternative methods of understanding the achievement gap, creating new ways of investigating test procedure integrity, and contextualizing the results of student growth models.

Meg Towle
Director of Business Development | Tembo

Meg joins Tembo's strategic development team from a career in public health focused on primary care for women and children, implementation science, and integrated data systems. She has worked with the World Health Organization's child health and HIV departments, and most recently served as an advisor with Columbia University to India's national ministry of health on improving public health delivery for a catchment population of 10 million. Meg has Master's Degrees in health systems management from the London School of Economics and the Liverpool School of Tropical Medicine.

Eric Segraves
Data Analyst | Tembo

Eric is experienced in synthesizing complex datasets and ensuring data quality as an analyst at Tembo and Capital One Services. He has designed and managed multiple databases to support custom, client-facing web reporting solutions, and has advanced data coding experience. Eric studied economics, mathematical sciences, and business administration at Carnegie Mellon University.

Michael Moore
Director of Product Development | Tembo, Inc.

Michael is an expert in the visual display of quantitative information. He completed a Master's Degree in Technology and Communications at Georgetown University and recently completed his Ph.D. coursework at the Graduate School of Education at the University of Pennsylvania.

Sam Bishop
Chief Information Officer | Tembo, Inc.

Sam has been programming computers for over 15 years. After receiving a Computer Science degree from Lehigh University, Sam created a web development firm that worked with companies and organizations across the globe.

Section 2

Narrative [Part 3]

References

References

Abigail Smith
Deputy Mayor for Education
The District of Columbia
Washington, DC
abigail.smith@dc.gov

Can especially speak to Tembo's skills in analytics, predictive modeling, stakeholder engagement, and translation of analytics into practice.

Jeff Noel
Director of Data Management
Office of State Superintendent of Education
Washington, DC
jeffrey.noel@dc.gov

Can especially speak to Tembo's skills in data management, analytics, predictive modeling, web-based data integration and product development, stakeholder engagement, and translation of analytics into practice.

Paul Kihn
Deputy Superintendent
The School District of Philadelphia
Philadelphia, PA
pkihn@philasd.org

Can especially speak to Tembo's skills in analytics and the design and development of practice-oriented tools.

Section 3

Budget

Budget

Funding Request

The proposed budget and narrative reflect the key milestones by project phase outlined in section 2.2, and our team can work with the department to create a suitable invoice schedule. Our budget utilizes our hourly rate for analytics, design, and web development at $165 per hour; please see the accompanying Excel for detail. Tembo is a small business and we have priced our rate very competitively in order to best meet our public sector clients' needs.

Discovery & Stakeholder Engagement — $ 123,750

This amount includes all project management and client communication, including on-site discovery interviews with subject matter and data experts; existing research review; and the creation and maintenance of a detailed project charter, analytic plan, and data dictionary.

Requirements Documentation & Design — $ 82,500

This amount includes the documentation of all key technical and functional requirements for the tool. It also includes the entire design process, including detailed wireframes for all views.

Data Collection & Integration — $ 99,000

This amount includes all extraction, transformation, and loading (ETL) activities for data, including the creation of secure file transfer methods, custom codling, data cleaning, and quality assurance. These activities will result in clean, flat analysis files, a database to support the interactive data tool and a schema for that database.

Analysis — $ 148,500

This amount includes all analytical activities in the project, which includes building the statistical models that will power the tool, and the application of estimative techniques to DHS data to develop predictive models for specified, DHS-prioritized outcomes. This amount also includes the documentation of analytical results and metadata loads.

Development — $ 330,000

This amount includes the purchase, set-up, and configuration of all necessary software and hardware for internal and external development and staging environments[3]. It also includes the development time required to create an API for querying the database and the template of the web application views.

User Testing & Quality Assurance — $ 132,000

This amount includes internal and external quality assurance, including the processes (e.g. documentation, iterative fixes) established for independent checkers and user testing.

Implementation Support — $ 41,250

This amount includes the implementation of 15-20 days of on-site training and consultations, and the development of all supporting documentation for the product's use and scale-up (e.g. user guides, Wiki, online walk-through, open ticketing system).

TOTAL — $ 957,000

[3] Hosting and maintenance to be confirmed with AC DHS depending on requirements

Appendix I

Work Samples

Highlights: customizable filtration and interface, multi-indicator analysis

Overview

Tembo is currently working with the School District of Philadelphia (SDP) to develop a district-wide web-based data exploration tool. This tool provides users with an intuitive and customizable interface for visualizing service delivery across multiple indicators. The Analyzer is a good example of the type of data tool Tembo would like to build for AC DHS. The tool could allow staff to conduct a deep, filterable search of results (say, by intervention or catchment area) and make comparisons across entities with both historical and projected data (such as welfare outcomes) under various assumptions or conditions (such as expected service delivery points).

Application

Using a simple scatterplot, SDP users can visualize the relationship between measures of performance, academic growth, climate, and college readiness across the District's entire portfolio of schools. Flexible menus allow users to further refine their search, filtering data on a variety of school-level characteristics (e.g. management type, region), and detailing both summary results and individual school scores in data tables beneath the main chart. The end result is a streamlined system that allows district staff to quickly test hypotheses and investigate data on the fly.

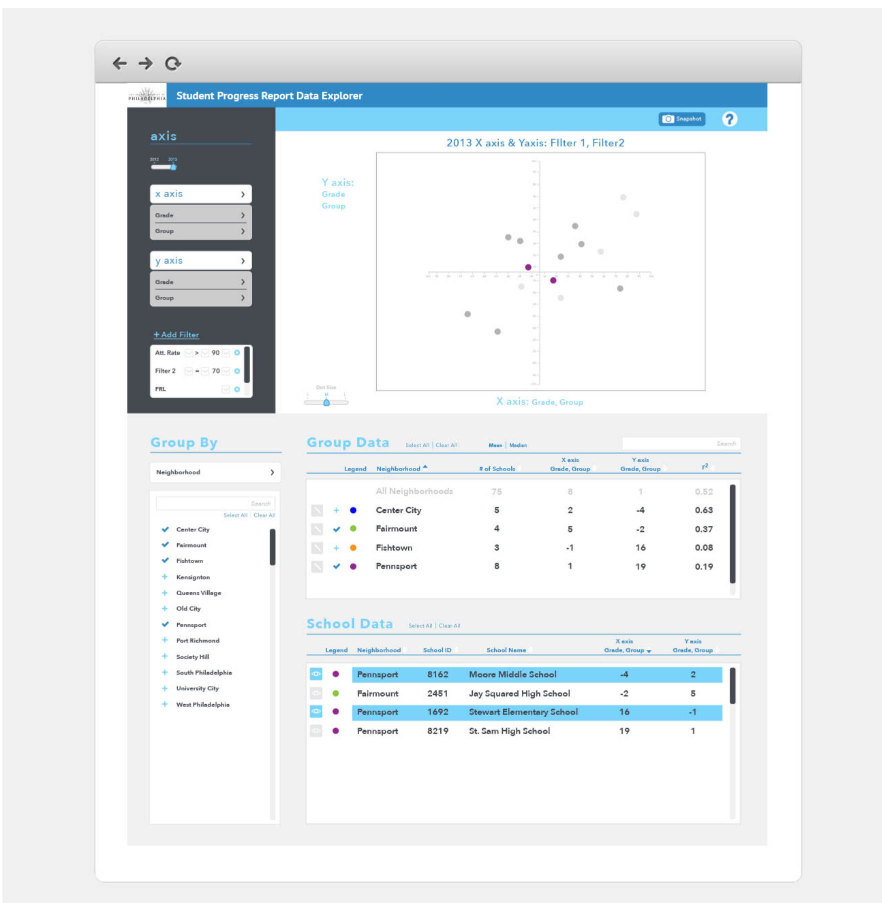


Figure 1: Portfolio Performance Analyzer Wireframes, Demonstrating Select Filters

Highlights: custom data warehouse, data integration, predictive analytics

Overview

The District of Columbia had no systematic way of identifying which students were most in need of interventions, and there was no evidence to support which interventions would be most effective for different types of students. Tembo was contracted to create a platform that would identify students who are at risk of leaving school prior to graduation and develop initiatives to support high school and college readiness and increase high school graduation rates. Tembo developed an operational data store to house longitudinal data for several different student cohorts that contains a combination of academic, behavioral, and demographic indicators. We built an interactive rule-builder that allows users to develop and test different combinations of these early warning indicators. Separately, our analytics team estimated 'best fit' early warning indicators and included the resulting model in the rule-builder tool.

Application

Tembo is currently building the next iteration of this tool, which allows analysts and administrators to drill down to individual-level data and identify particular users (students) who are at-risk. Tembo envisions that a tool for AC DHS would involve both the macro, cross-department analytics with capability to drill to client-level data. It should also be noted that this tool, in its current design, is being used by a very technical data user, and was not designed to be a practitioner-focused dashboard.

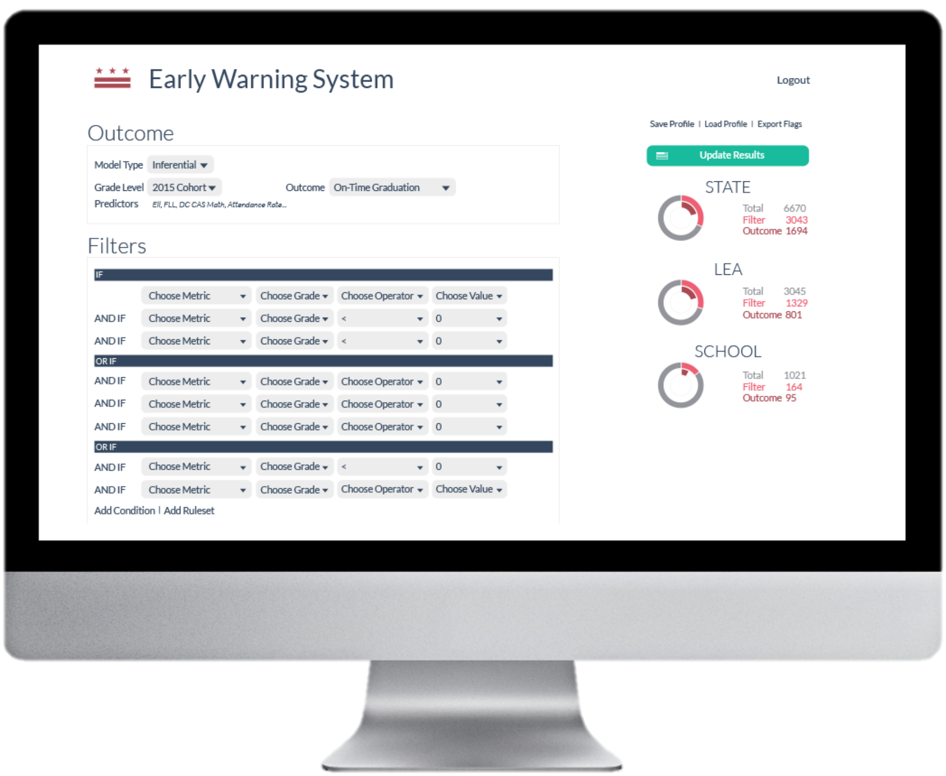


Figure 2: Early Warning System, Landing Filter View

Highlights: predictive modeling, simulation, product development

Overview

NYC DOE recognized that progress report metrics did not adequately control for differences in incoming student characteristics, and asked Tembo to design a methodology and reporting method for the same. Tembo estimated school growth on progress, performance, and environment metrics using multilevel models, and built an Excel-based scoring simulator to compare results of school performance under various model specifications.

Figure 3: Predictive Modeling Tool for NYC DOE

Highlights: analytics, product development, research to practice translation

Overview

In 2013, the School District of Philadelphia hired Tembo to aid in the creation of a new, comprehensive performance management framework. The goal of this project was to create clear, concise, and transparent measures of school quality that would apply equally to traditional public and public charter schools in the city. Towards this end, Tembo helped to design and calculate the School Progress Report (SPR), an analytic tool that uses discrete measures of school performance to group schools into different performance levels. The District intends to use these performance levels to guide high stakes decision-making and direct intervention in the district.

Application

Because of the high stakes associated with the SPR, it is important that principals and district staff understand how their scores are calculated. To help meet this need, Tembo created the SPR calculator, a custom web app designed specifically to help school leaders better understand their SPR scores. The SPR Calculator has two primary functions. First, it allows any principal to quickly view their overall SPR score, as well as their subscores in specific areas of performance (e.g. climate, college readiness). Second, the tool allows principals to model changes in these scores. For example, using the SPR calculator, a principal could simulate how improving attendance would affect the school's overall SPR rank. By providing school leaders with the ability to model these effects, the SPR calculator serves as a powerful predictive tool, providing principals with the ability to thoughtfully plan ahead, and work to align their school's performance to district-wide goals and expectations.

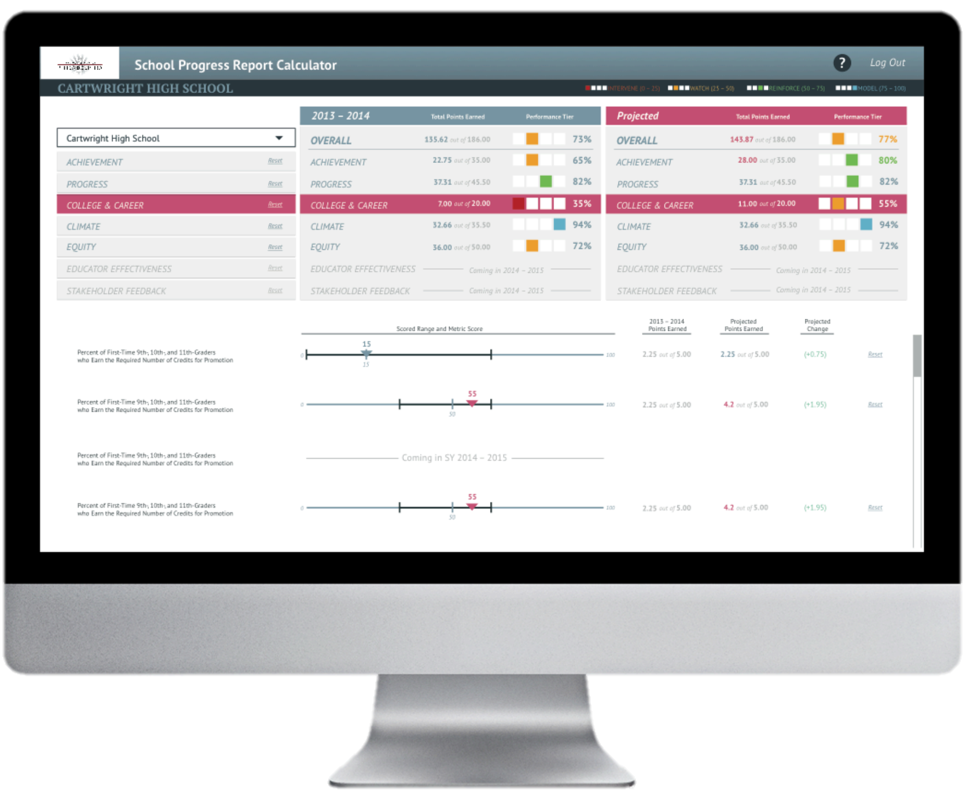


Figure 4: Predictive Calculator Tool

Insights Dashboard
Digitas Health

Highlights: product development, multi-level dashboards, automatic analytical tools

Overview
Our Digitas Health engagement is a good example of our ability to rapidly build knowledge and conduct complex analyses in a new subject domain: in this case, digital marketing and pharmaceuticals. Tembo is working on a marketing mix analysis to fine-tune a pharmaceutical company's customer relationship management. The challenge is that customers engage with the brand through multiple channels, but it's unclear which marketing and retention strategies are most effective in converting audiences into pharmaceutical customers. Tembo created a research design that allows the client to understand the specific pathways of engagement that customers have with their brand and the conversion rates of each pathway.

Application
Based on these analyses, our team is in the process of finalizing an engagement to build multi-view dashboards across several drug indications that allow users (marketing managers) to explore key insights and further drill into data by pathway. Our discovery period for creating such dashboards involves developing a deep understanding the user's key questions, business processes, and interface requirements so that our custom product is accessible, integrated, and scalable for further analyses.

Figure 5: Insights Dashboard Wireframes

Appendix II

Curriculum Vitae

In Alphabetical Order

Sam Bishop
sam@temboinc.com

Professional Experience

Tembo, Inc. **2013-Present**
Chief Information Officer
Lead architecture planning and development of data visualization tools from server setup through front-end application coding. Specialize in the web application development process but oversee the entire development process on all web projects.

Connected Web Solutions **2006-2013**
Founder and President
Founded and managed a web design agency profitable by completion of the first year in operation. Designed and developed 100+ websites and applications for clients around the world (US, UK, and Australia) as well as internal tools. Projects completed ranged from simple static websites to dynamic custom ecommerce platforms as well as custom productivity tools. Web applications developed for sectors including healthcare, technology, consulting, real estate, service and retail, sports, and higher learning.

Education

Lehigh University **2006**
BA, Computer Science (minor in Design)

Steve Cartwright
steve@temboinc.com

Professional Experience

Tembo, Inc. **2013-Present**
Director of Data Analytics
Lead projects focused on the integration, transformation and analysis of large-scale education datasets to power performance management and data visualization tools. Specialize in longitudinal analysis of student achievement data and statistical programming in Stata.

StudentsFirst **2012-2013**
Director of Analytics
Integrated voter, volunteer, demographic and geospatial data on the organization's 2 million members using Stata, SQL, and ArcGIS. Developed voter research and micro-targeting analytics strategy to profile likely supporters for direct marketing. Led survey team in scientifically polling membership and conducting cluster analysis to identify market segments. Managed 60+ user Salesforce implementation.

DC Public Schools **2009-2012**
Manager of Analytics
Served as analytic lead for the district by managing and facilitating all cleaning, analysis, and reporting of high-stakes student achievement data. Led research, development, and implementation of district-wide performance management tools, including web and print school scorecards and interactive performance data dashboards.

DC Healthy Families Thriving Communities Collaborative Council **2008-2009**
Research Analyst
Advised child welfare leaders and practitioners on data collection and performance measurement strategies. Developed, tested, and automated reporting of performance metrics using family outcome data.

The Urban Institute **2007-2008**
Research Assistant, Education Policy Center
Cleaned and analyzed large longitudinal databases from state Departments of Education as researcher with the Center for Analysis of Longitudinal Data in Education Research (CALDER). Conducted rigorous quantitative analysis of student achievement data.

Publications

Howard, K., Cartwright, S., Barajas, R.G. (2009). Examining the impact of parental risk on family functioning among homeless and housed families. *Amer. J. of Orthopsychiatry*, 79(3), 326-335.

Education

Harvard University Center for Education Policy Research **2009-2011**
Fellow, Strategic Data Project (concurrent with DC Public Schools)

University of Notre Dame **2007**
BA, Economics and Econometrics, African and African American Studies

Frank P. Cervone
fcervone@advokid.org

Professional Experience

Support Center for Child Advocates
Executive Director **1992-Present**
General Counsel **1990-1992**

- Consultation with volunteer attorneys and staff social workers
- Recruitment, training and supervision of volunteer attorneys
- Administration and planning
- Individual, corporate and foundation fundraising
- Direct and co-counsel representation of children
- Special Projects
    - Adoption and Foster Care Task Force; Law Enforcement Child Abuse Project
    - Co-founder, National Children's Law Network
- Community education programs
- Training of Family Court panel attorneys
- Next Friend for federal class action Baby Neal v. Casey and amicus filings
- Various advocacy efforts for individual relief and systemic reform

Delaware County Legal Assistance Association **1989-1990**
Adjunct Clinical Professor, Villanova University School of Law
Staff Attorney

- Supervision and training of law students in child support and domestic abuse cases
- Direct client representation
- Chester Police Department training in domestic abuse
-

Saint Gabriel's System **1984-1989**
Legal Counsel

- Regulatory compliance, negotiation and review; policy analysis and development
- Contract preparation, administration and review; negotiations and hearings
- Special administrative assignments
- Training for lawyers, administrators, educators and social service staff

Delaware County Legal Assistance Association **1982-1983**
Centro San Juan Bautista Law Project, Staff Attorney

- Bilingual advocacy for community legal services cases
- Administrative law practice

Activities

American Bar Association
- Children's Law Committee Working Group, Section of Litigation (1998-2011)
- Co-chair (1995-98), Task Force on Children, Section of Litigation
- Steering Committee on the Unmet Legal Needs of Children
- Governance Board, Center on Children and the Law (1998-2000)

Children's Trust Fund of Pennsylvania, Board Member and Chair (2004-2014)

Joint State Government Commission,
Chair, Advisory Committee on Child Welfare Services (2000-2003)
Member, Advisory Committee on Adoption Law (1997-2000)
Member, Special Committee on Surrogacy (2006-2008)

National Quality Improvement Center on the Representation of Children in the Child Welfare System, Advisory Committee

Activities, continued

Pennsylvania Bar Association

Commission on Justice Initiatives, Changing Culture of Custody Committee
Children's Rights Committee

Pennsylvania Supreme Court, Juvenile Court Procedural Rules Committee (2004-2007, 2008-2014)

Philadelphia Bar Association

- Committee on Delivery of Legal Services to the Poor
- Family Law Section
- Former Chair, Children's Rights Committee

Philadelphia Children's Alliance, Board of Directors (1992-present)

Philadelphia Futures, Mentor (1996-2000)

Member, Mayor's Child Welfare Review Panel (2006-2007)

Philadelphia Department of Human Services Improving Outcomes for Children/Child Welfare Demonstration Project Steering Committee (2011-present)

Awards

- St. Thomas More Award, presented by St. Thomas More Society of Philadelphia (1997)
- Delaware Valley Chapter of American Corporate Counsel Association, for leadership in establishment of Corporate Counsel Pro Bono Campaign (1997)
- American Bar Association Young Lawyers Division Child Advocacy Law Award (1998)
- Pennsylvania Bar Association Child Advocate of the Year Award (1998)
- Philadelphia Magazine "50 People to Watch -- 2000" (1999)
- Rutgers University School of Law-Camden -- 2000 Mary Philbrook Public Interest Award
- Villanova University School of Law -- 2001 Donald W. Dowd Alumni Assoc. Award for Public Service
- Philadelphia Bar Association Committee on the Legal Rights of Lesbians and Gay Men -- 2001 Advocate for Justice Award (now Cheryl Ingram Advocate for Justice Award)
- Philadelphia Magazine 2004 - 2009 Pennsylvania Super Lawyer
- La Salle University Signum Fidei Award (2004)
- 2005 Lawdragon 500 Leading Lawyers in America
- Philadelphia Bar Foundation Award (2006)
- 2006 Lawdragon 3000 Leading Plaintiffs' Lawyers in America
- 2009 Good Shepherd Mediation Shepherds of Peace Award
- 2009 Philadelphia Alliance Leadership Award
- 2010 Pennsylvania Coalition Against Rape Vision of Hope Award
- 2010 HIAS and Council Advocacy Award
- 2011 Philadelphia Bar Association Andrew Hamilton Award
- 2013 Legal Intelligencer Lifetime Achievement Award
- 2014 American Bar Association Mark Hardin Award for Child Welfare Legal Scholarship and Systems Change

Bar Memberships

Supreme Court of Pennsylvania
United States District Court, Eastern District of Pennsylvania
United States Court of Appeals for the Third Circuit

Recent Publications

[various articles in Frankly Speaking at www.advokid.org]

Frank P. Cervone, “Learning to Leave Positive Marks and Recognize Bad Ones,” The Legal Intelligencer, March 25, 2013.

Frank P. Cervone and Scott J. G. Finger, “Representing Children in Custody Disputes—Counsel for Children and Guardian Ad Litem” in Custody Law & Practice in Pennsylvania, Philadelphia 2013.

Frank P. Cervone, “The weight of child abuse: Should a killer’s horrific childhood matter in deciding his fate?” Pittsburgh Post-Gazette, September 18, 2012.

Frank P. Cervone, “Moral Duty Receives a Fresh Look”, The Patriot-New, July 15, 2012.

Frank P. Cervone, “William Lynn and Jerry Sandusky: What we’ve learned”, The Philadelphia Inquirer, June 27, 2012.

Frank P. Cervone and Philip Scribano, MD, “Lessons from a Child’s Death”, The Philadelphia Inquirer, May 15, 2012.

Testimony December 13, 2011 before the U.S. Senate Health, Education, Labor and Pensions Subcommittee on Children and Families. “Breaking the Silence of Child Abuse: Protection, Prevention, Intervention and Deterrence.” www.help.senate.gov

Frank P. Cervone, “Lessons from the Basement”, The Philadelphia Inquirer, November 3, 2011.

Frank P. Cervone and Liz Wagner, “The Greatest Feeling in the World: What Giving Does for the Giver”, The Legal Intelligencer, January 6, 2011.

Frank P. Cervone and Dr. Maria D. McColgan, MD, “Child-Welfare Challenges For the Next PA Governor”, The Philadelphia Inquirer, October 27, 2010.

Frank P. Cervone, “No More Charleenis,” in The Daily News, November 11, 2009.

Frank P. Cervone, “Children’s Rights: Join the Movement,” in The Legal Intelligencer, October 26, 2009.

Frank P. Cervone, “The State of Child Abuse and Child Advocacy,” in The Philadelphia Lawyer, Spring 2009.

Frank P. Cervone, “The Price of Silence,” in Burlington County Times and Bucks County Courier Times, March 31, 2009.

Frank P. Cervone, “Change the Story: Child Advocate Lawyers Matter,” in The Legal Intelligencer, April 25, 2008.

Catherine C. Carr and Frank P. Cervone, “Bar Foundation Plays Crucial Role in Public Interest Community,” in The Legal Intelligencer, February 7, 2008.

Education

Villanova University School of Law **1982**
J.D. - *Wenk Community Legal Services Award*

LaSalle University **2004**
MA, Theology and Ministry

University of Pennsylvania **1979**
BA, American History – *cum laude, American History Honors Award*

Michael R. Moore
mike@ temboinc.com

Professional Experience

Tembo, Inc. **2012-Present**
Director of Product Development and Design
Work with district officials and school administrators to design custom data visualizations and analytical tools, both on- and off-line. Integrate and analyze data in SAS, Excel, and VBA.

Center for Policy Research in Education **2011-2012**
Research Assistant
Worked with Dr. Henry May as an independent evaluator of the I3 scale-up of Reading Recovery. Developed online data collection tools; conducted interviews and analyzed participant data.

Perspectives on Urban Education **2010-2012**
Editor-in-Chief
Oversaw a range of editorial tasks, including submissions, subscriptions, peer-review oversight, and website management. Helped double submission rate and improved readership by 50%.

University of Pennsylvania **2009-2010**
Research Assistant
Worked with Dr. Yasmin Kafai on a National Science Foundation CreativeIT grant, researching digital media practices in middle school youth.

Publications

Moore, M. R. (2010). Adaptation and new media. Adaptation, 3(2), 179-192.

Kafai, Y.B., Peppler, K.A., Burke, W.Q., Moore, M., & Glosson, D. (2010). Froebel's Forgotten Gift: Textile Construction Kits as Pathways into Design and Computation. Proceedings of the Interaction Design for Children Conference, Barcelona, Spain: ACM Digital Library.

Education

University of Pennsylvania **2009-Present**
PhD, Graduate School of Education (candidate)

Georgetown University **2009**
MA, Communication, Culture & Technology (with distinction)

University of Pennsylvania **2006**
BS, Wharton School of Business (summa cum laude)

Eric Segraves

eric@temboinc.com

Professional Experience

Tembo, Inc. **2013-Present**
Data Analyst
Lead projects focused on the integration, transformation, and analysis of large-scale education datasets to power performance management and data visualization tools. Specialize in longitudinal analysis of student achievement data and statistical programming in Stata. Synthesize complex datasets of education metrics by fusing information from many data sources, and performs data integrity checks for quality assurance. Analyzes data using SAS, SQL, and Excel, and designs databases to support custom web reporting tools.

Capital One **2011-2013**
Data Analyst
Implemented automation processes for many of the team's dashboards and data pulls using SQL, SAS, and VBA. Developed daily, weekly, and monthly metrics dashboards to support internal customers in solving business problems. Worked with customers to fulfill data requests from a Teradata relational database by mining and analyzing extremely large datasets. Provided reports on data-driven analytical results to department leaders.

Education

Carnegie Mellon University **2011**
BS, Economics
Minors in Mathematical Sciences and Business Administration

David A. Stewart
david@temboinc.com

Professional Experience

Tembo, Inc. **January 2010-Present**
Founder and CEO
Tembo, Inc. (Tembo) is a leading provider of data-related services to public sector organizations. The company is built on the belief that the right data, combined with engaging designs, lead to deeper understandings and better decisions.

New York City Department of Education **2007-2009**
Director of Analytics
Developed new metrics to improve existing school accountability instruments such as the Progress Reports. Provided quality assurance and SAS programming support to Progress Report team. Created interactive data tools to support instructional and strategic planning.

Executive Director, Evaluation and Performance Reporting
Oversaw development and implementation of district's school accountability instruments: Progress Reports, Quality Reviews, and Learning Environment Surveys. Participated on cross-functional team to develop a data mart that will support internal and external research and analytics. Collaborated with IBM on functional requirements for Achievement Reporting and Innovation System (ARIS), a citywide data warehouse, reporting, and knowledge management system.

The Grow Network/McGraw-Hill **2005-2007**
Vice President, Product Development and Research
Managed staff of more than forty full-time employees on Content Development, Design, Editorial, Product Implementation, and Research and Development teams. Led all phases of product development process including discovery, business case development, field-testing, and development of functional requirements. Developed SAS program to calculate preliminary Progress Reports for the New York City Department of Education.

Vice President, Client Services and Educational Policy
Managed staff of more than twenty full-time employees to support national and international clients. Hired, trained, and mentored new program managers, professional development coordinators, and customer support representatives. Advised executive and product development teams on assessment-related issues. Acted as a thought partner to senior education officials, government officials, and non-profit education agencies.

The Princeton Review **1992-2005**
Associate Vice President, K-12 Division
Managed staff of project managers who oversaw implementation of comprehensive programs in the School District of Philadelphia, the Los Angeles Unified School District, and in Fairfax County Public Schools. Delivered assessment-related professional development seminars to educators. Supported new product development, advising corporate Assessment Strategy Team on development and data analysis.

Executive Director, Berkeley, CA and Buffalo, NY
Hired and managed full- and part-time staff of over 100 employees. Participated on national product teams to improve product quality, develop marketing strategies, and monitor changes in the standardized testing industry. Opened Princeton Review's first office in Canada in Toronto, Ontario.

Invited Keynote Presentations

Keeping Focused on What Matters, Using Data to Improve College and Career Readiness: Center for Center for School Study Councils, Penn Center for Educational Leadership and Graduate School of Education, University of Pennsylvania. Sewell, NJ, 3/14 and 7/14

Strategic Data Project *Beyond the Numbers Convening*, Center for Education Policy Research, Harvard University. Cambridge, MA, 4/14

Innovative Thinkers Session, Tennessee Department of Education. Nashville, TN, 1/14

National Association of Charter School Authorizers. La Jolla, CA, 10/13

Publications

Cracking the SAT II: Spanish (updated and revised). New York, NY: Random House, 2003-2004.

Cracking the Regents: Spanish. New York, NY: Random House, 1998-2001.

Education

University of Pennsylvania **2004**
MS, Statistics, Measurement, Assessment, and Research Technology

Occidental College **1992**
BA, Spanish

Meg Towle

meg@temboinc.com

Professional Experience

Tembo, Inc. **2013-Present**
Director of Business Development
Driving business strategy for start-up firm that provides data services and custom visualization tools.

World Health Organization **2010-2014**
Consultant, Child Health
Developed innovative training program on algorithm for managing childhood illness; coordinated piloting for 600 nurses and national technical adaptations for S. Africa, Tanzania, and Zimbabwe. Course demonstrated 80% cost reduction and high feasibility; adopted as international standard. Also created an Excel tool for national governments to analyze highly fragmented drug procurement and supply chain systems, including early warning alerts. Designed 10-country field test and ran analysis. Pilot implementation led to national training, supply chain governance, and technology solution overhauls.

Columbia University **2010-2013**
Health Research Associate, Global Health Fellow
Developed and executed strategic plan for a 5-year demonstration project with India's national health ministry that focused on improving service delivery for a population of 10 million. Designed and led district-level systems assessments, and generated $32 million in proposals to government by costing and modeling recommendations. Managed engagement model in state of 84 million and executed state's first quality improvement system in 84 care facilities, including anti-absenteeism strategies (biometrics, GPRS tracking), supply chains expected to increase immunization availability 4x, an integrated, GIS-based health information system, and first on-site mentor-training model for primary care nurses.

Board of Directors, TTL Foundation **2005-Present**
Co-created foundation that supports innovative medical and nutrition care model for ~ 1,500 children in rural Lesotho, with over 95% recovery rate of clients often impacted by HIV and severe acute malnutrition. Provide technical support on care management in Lesotho. Built communications platform and donor relationship strategy as Chief Communications Officer (2005-10), and created first financial strategy (portfolio now exceeds $1.5 million).

Gates Foundation (Avahan) **2009**
Designed and piloted framework to evaluate the effectiveness of decentralized governance structures amongst partners of a $338 million national HIV strategy in India.

SAATHII **2008**
Conducted research on scaling up maternal and child HIV care within public-private partnerships, and designed training in qualitative action research methodologies for the national organization.

Publications

2014. World Health Organization. Distance Learning Course: Integrated Management of Childhood Illness. Geneva, Switzerland.

2013. Luyirika, Towle, Achan, et al. Scaling Up Paediatric HIV Care with an Integrated, Family-Centred Approach: An Observational Case Study from Uganda. PLoS ONE 8(8): e69548.

2012. Mutanga, Raymond, Towle, et al. Institutionalizing provider-initiated HIV testing and counselling for children: an observational case study from Zambia. PLoS ONE 7(4): e29656.

Publications, continued

2012. Suthar, Sitienei, van Gorkom, et al. Integrated community-based health campaigns for addressing HIV associated tuberculosis. International Journal of Tuberculosis and Lung Disease, 16(4): 430-436(7).

2011. World Health Organization. Manual on Paediatric HIV Care and Treatment for District Hospitals: Addendum to the Pocket Book of Hospital Care of Children. Geneva, Switzerland.

2011. World Health Organization & AMD Partner Network. Harmonized Monitoring and Evaluation Indicators for Procurement and Supply Management Systems: Tracking the performance of PSM system for ARV, anti-malarial, and anti-tuberculosis medicines. Geneva, Switzerland.

2011. Bajpai, Towle, Vynatheya. Model Districts as a Roadmap for Public Health Scale-up in India. Columbia Global Center | South Asia Working Paper Series, No. 4.

2010. Fanzo, Pronyk, Dasgupta, Towle, et al. 'An Evaluation of Progress Toward the MDG-1 Hunger Target: A country-level, food and nutrition security perspective.' UN MDG Task Force & UN WFP.

2009. Towle. Integrating parent-to-child HIV/AIDS transmission into maternal, child, and reproductive health: the public/private service divide in southern India. International Journal of Health Planning & Management, 24: S30-51.

2008. Towle & Lende. Community approaches to preventing mother-to-child HIV/AIDS transmission: perspectives from rural Lesotho. African Journal of AIDS Research, 7(2) 219-228.

Education

London School of Economics **2009**
MS, Community Health
Marshall Scholar

Liverpool School of Tropical Medicine **2008**
MS, Health Management
Marshall Scholar

University of Notre Dame **2007**
BA, Medical Anthropology, International Studies

Appendix III

Allegheny County Proposal Forms

APPENDIX A
PROPOSAL AUTHENTIFICATION FORM

TITLE: Decision Support Tools and Predictive Analytics in Human Services

DUE DATE: APRIL 18, 2014

The undersigned hereby offers to furnish and deliver the services as specified in strict accordance with the RFP and scope of proposal, all of which are made a part of this request. This offer is not subject to withdrawal without permission of the County of Allegheny Department of Human Services Director.
FULL LEGAL COMPANY NAME: Tembo Inc **DOING BUSINESS AS:** **STREET ADDRESS:** 1639 N. Hancock St. Studio 203 **CITY, STATE AND ZIP CODE:** Philadelphia, PA 19122 **AUTHORIZED SIGNATURE:** **PRINT NAME:** David Stewart **TITLE OF AUTHORIZED SIGNER:** CEO **TELEPHONE #:** 215-427-3608 **FAX #:** 215-427-9320 **WEBSITE URL:** www.temboinc.com **E-MAIL ADDRESS:** david@temboinc.com

Chapter 2
COMPANY INFORMATION
(This information is for tracking purposes only and has no role in the determination of the responsible proposer.)

☐ Check here if your firm is registered with the Allegheny County Department of Minority, Women and Disadvantaged Business Enterprises

☐ Check here if your firm is a "Minority Business Enterprise" or "MBE" as defined in the Small Business Act, 15 USC

☐ Check here if your firm is a "Women Business Enterprise" or "WBE" as defined in the Small Business Act, 15 USC

☒ Check here if your firm is a "Small Business" as defined by the Small Business Administration (13 C.F.R. 121.201, in most cases, this means a business with 500 or fewer employees)

NOTE: THIS PAGE MUST BE SUBMITTED WITH YOUR PROPOSAL. ALL PAGES REQUIRES A LIVE SIGNATURE SIGNED IN BLUE INK.

APPENDIX B
ABBREVIATED APPLICATION

1. Primary Contacts

	Chief Executive	Chief Information Officer	Chief Financial Officer	Contract Processing Contact
Name	David Stewart	Sam Bishop	David Stewart	Christine Risley
Email	david@temboinc.com	sam@temboinc.com	david@temboinc.	christine@temboinc.com
Phone	215-427-3608	215-427-3608	215-427-3608	215-427-3608

Note: If you are an individual applying, you may identify yourself for all of the above roles.

2. I/we certify that this I/we/this organization is not currently under suspension or debarment by the Commonwealth of Pennsylvania, any other state, county or the federal government.

☒ So certified

3. Have you ever obtained or been denied a performance or fidelity bond, or has your bond ever been revoked?

☒ Yes ☐ No

If yes, explain: We currently have an ERISA fidelity bond in place which covers our 401k plan.

4. Has an application to be an Allegheny County provider/vendor been denied in the past?

☐ Yes ☒ No

If yes, explain:

5. Have you ever filed for bankruptcy?

☐ Yes ☒ No

If yes, explain:

6. Have your paid all taxes for the past years, including but not limited to real estate tax, employer taxes, employee withheld taxes, personal income tax (if individual)?

☒ Yes ☐ No

If yes, explain: All tax liabilities had been paid and all tax payments are up to date.

7. Do you have the capability to do electronic billing if required?

☐ Yes ☒ No

If yes, explain:

8. Do you currently carry the insurance (see contract on DHS website) required to enter into a contract with DHS?

☒ Yes ☐ No

If yes, explain: Yes, we currently carry the required insurance elements to enter into a contract with DHS.

9. Do you/your staff have valid Pennsylvania driver licenses?

☒ Yes ☐ No

If yes, explain: Several of our staff members have valid Pennsylvania drivers licenses.

As an authorized signatory for Tembo Inc. I hereby certify to the best of my knowledge and belief that the information in this proposal and application is true and accurate.

Signature: ________________ Date: April 9, 2014

Print/Type Name: David Stewart Title: CEO

APPENDIX C INTERNAL REVENUE SERVICE W-9
A fill-in version of this form can be obtained at the IRS website.

Form **W-9**
(Rev. October 2007)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the requester. Do not send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)
Tembo Inc.

Business name, if different from above

Check appropriate box: ☐ Individual/Sole proprietor ☒ Corporation ☐ Partnership
☐ Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶ ....
☐ Other (see instructions) ▶

☐ Exempt payee

Address (number, street, and apt. or suite no.)
1639 N. Hancock St. Studio 203

Requester's name and address (optional)

City, state, and ZIP code
Philadelphia, PA 19122

List account number(s) here (optional)

Part I **Taxpayer Identification Number (TIN)**

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Social security number

or

Employer identification number
61 1608849

Part II **Certification**

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
3. I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here **Signature of U.S. person** ▶ **Date** ▶ April 9, 2014

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),

2. Certify that you are not subject to backup withholding, or

3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

Cat. No. 10231X Form **W-9** (Rev. 10-2007)

• The U.S. grantor or other owner of a grantor trust and not the trust, and

• The U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.

2. The treaty article addressing the income.

3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.

4. The type and amount of income that qualifies for the exemption from tax.

5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,

2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Also see *Special rules for partnerships* on page 1.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of $50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a $500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name" line.

Limited liability company (LLC). Check the "Limited liability company" box only and enter the appropriate code for the tax classification ("D" for disregarded entity, "C" for corporation, "P" for partnership) in the space provided.

For a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Regulations section 301.7701-3, enter the owner's name on the "Name" line. Enter the LLC's name on the "Business name" line.

For an LLC classified as a partnership or a corporation, enter the LLC's name on the "Name" line and any business, trade, or DBA name on the "Business name" line.

Other entities. Enter your business name as shown on required federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name" line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt Payee

If you are exempt from backup withholding, enter your name as described above and check the appropriate box for your status, then check the "Exempt payee" box in the line following the business name, sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

The following payees are exempt from backup withholding:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2).

2. The United States or any of its agencies or instrumentalities,

3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,

4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or

5. An international organization or any of its agencies or instrumentalities.

Other payees that may be exempt from backup withholding include:

6. A corporation,

7. A foreign central bank of issue,

8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,

9. A futures commission merchant registered with the Commodity Futures Trading Commission,

10. A real estate investment trust,

11. An entity registered at all times during the tax year under the Investment Company Act of 1940,

12. A common trust fund operated by a bank under section 584(a),

13. A financial institution,

14. A middleman known in the investment community as a nominee or custodian, or

15. A trust exempt from tax under section 664 or described in section 4947.

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 15.

IF the payment is for . . .	**THEN the payment is exempt for . . .**
Interest and dividend payments	All exempt payees except for 9
Broker transactions	Exempt payees 1 through 13. Also, a person registered under the Investment Advisers Act of 1940 who regularly acts as a broker
Barter exchange transactions and patronage dividends	Exempt payees 1 through 5
Payments over $600 required to be reported and direct sales over $5,000[1]	Generally, exempt payees 1 through 7[2]

[1] See Form 1099-MISC, Miscellaneous Income, and its instructions.

[2] However, the following payments made to a corporation (including gross proceeds paid to an attorney under section 6045(f), even if the attorney is a corporation) and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, and payments for services paid by a federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited liability company (LLC)* on page 2), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at *www.ssa.gov*. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at *www.irs.gov/businesses* and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting *www.irs.gov* or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: *A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.*

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt payees, see *Exempt Payee* on page 2.

Signature requirements. Complete the certification as indicated in 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account [1]
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor [2]
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee [1]
b. So-called trust account that is not a legal or valid trust under state law	The actual owner [1]
5. Sole proprietorship or disregarded entity owned by an individual	The owner [3]
For this type of account:	**Give name and EIN of:**
6. Disregarded entity not owned by an individual	The owner
7. A valid trust, estate, or pension trust	Legal entity [4]
8. Corporate or LLC electing corporate status on Form 8832	The corporation
9. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
10. Partnership or multi-member LLC	The partnership
11. A broker or registered nominee	The broker or nominee
12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity

[1] List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

[2] Circle the minor's name and furnish the minor's SSN.

[3] You must show your individual name and you may also enter your business or "DBA" name on the second name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

[4] List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see Special rules for partnerships on page 1.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, social security number (SSN), or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

Call the IRS at 1-800-829-1040 if you think your identity has been used inappropriately for tax purposes.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to *phishing@irs.gov*. You may also report misuse of the IRS name, logo, or other IRS personal property to the Treasury Inspector General for Tax Administration at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: *spam@uce.gov* or contact them at *www.consumer.gov/idtheft* or 1-877-IDTHEFT(438-4338).

Visit the IRS website at *www.irs.gov* to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, the District of Columbia, and U.S. possessions to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.

APPENDIX D

Allegheny County

Vendor Creation Form

Controller's use only:

Supplier No.________________

1099 Eligibility: ☐ Yes ☐ No

☒ Add ☐ Change Supplier No. _____

Company Information:

Tembo Inc.

Company Name (Please type or print)

Federal Tax ID (TIN)

61-1608849

Original W-9 must be attached

Required information

Type of Service Provided

☒ Independent Contractor
☐ Maintenance/Service Agreement
☐ Insurance
☐ Personal Reimbursement
☐ Other (please list)

☐ Rent
☐ Care Giver
☐ Legal
☐ Medical

Type of Commodity Provided

(please describe below)

data services and tool

Required Information

Minority Or Women Owned ☐ Yes ☒ No

If yes select ethnicity and gender of the vendor below:

☐ Asian Pacific American
☐ Black American
☐ Hispanic American
☐ Native American
☐ Subcontinent Asian American
☐ Non-Minority Woman
☐ Other

If Yes ☐ Male ☐ Female

Certified By: ☐ PAUCP ☐ PADGS ☐ Non PA Certification

(attach copy of certification)

Non-Profits including Faith Based Organizations

☐ Faith Based Non-Minority
☐ Faith Based Minority
☐ African American Non-Profit
☐ Other Non-Profit

Outreach Manager Interface ☐ Yes ☒ No

APPENDIX D

Industry Classification by NAICS Code

Primary Industry 518210

Secondary Industry (if applicable) 514210

*If code is not known go to http://www.census.gov/epcd/naics02/naicod02.htm and select the correct code.

Supplier Information (Search Type "P") – (Where PO should be sent to place order)
Please type or print

Company Name ______ Telephone Number ______

Address Line 1 ______ Fax Number ______

Address Line 2 ______

Address Line 3 ______

City ______ State ______

ZIP Code ______

Required Information

Supplier/Remit To Information (Search Type "V") – (Where check will be mailed for payment. Check must be made payable to exact name listed under TIN provided or check cannot be processed.)

Please print or type

Supplier/Payee Name Tembo Inc.

Address Line 1 1639 N. Hancock St.

Address Line 2 Studio 203

Address Line 3 ______

City Philadelphia State PA

ZIP Code 19122

Telephone Number 215-427-3608

Fax Number 215-427-9320

*If the "remit to" information provided on form does not match invoices submitted for payment, the Controller's Office MUST contact supplier to verify address information before payments are processed. Thank you for your cooperation.

APPENDIX D

If the Allegheny County Department with which you do business is known, providing the information below will help in the processing of your payments. Failure to include the information may result in processing delays.

Allegheny County Departmental Contact		**Supplier/Payee Contact Name**	
Name	Leslie Lewis-Pollard	Name	Christine Risley
Telephone No.	412-350-5663	Telephone No.	215-427-3608
Fax No.	412-350-3414	Fax No.	215-427-9320
EMail Address:	Llewis-pollard@alleghenycounty.us	Email Address:	christine@temboinc.com